Volunteer Lake Assessment Program Individual Lake Reports

EASTMAN POND, GRANTHAM, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	4,907	**Max. Depth (m):**	9.2	**Flushing Rate (yr^{-1}):**	2.1
Surface Area (Ac.):	335	**Mean Depth (m):**	3	**P Retention Coef:**	0.61
Shore Length (m):	4,000	**Volume (m^3):**	4,066,500	**Elevation (ft):**	1095

TROPHIC CLASSIFICATION

Year	Trophic class
1999	MESOTROPHIC
2009	MESOTROPHIC

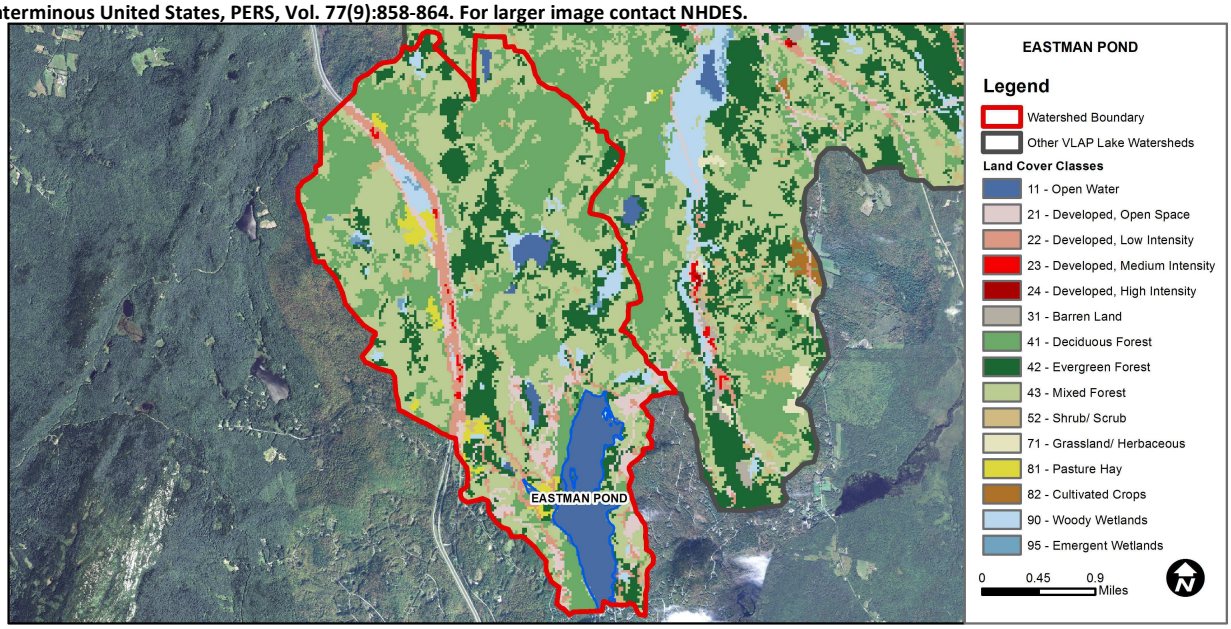
KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	The calculated median is from 5 or more samples and is > indicator and the chlorophyll a indicator is exceeded.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Very Good	There are a total of at least 10 samples with 0 exceedances of criteria.
	Dissolved oxygen satura	Cautionary	There are < 10 samples with 1 exceedance of criteria. More data needed.
	Chlorophyll-a	Slightly Bad	The calculated median is from 5 or more samples and is > indicator.
Primary Contact Recreation	Escherichia coli	Good	There are geometric means and all geometric means are < geometric mean criteria; and there has been a single sample exceedance.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	7.93	Barren Land	0.03	Grassland/Herbaceous	0.07
Developed-Open Space	5.02	Deciduous Forest	25.34	Pasture Hay	1.85
Developed-Low Intensity	4.45	Evergreen Forest	13.13	Cultivated Crops	0.01
Developed-Medium Intensity	0.22	Mixed Forest	37.64	Woody Wetlands	3
Developed-High Intensity	0	Shrub-Scrub	1.01	Emergent Wetlands	0.28

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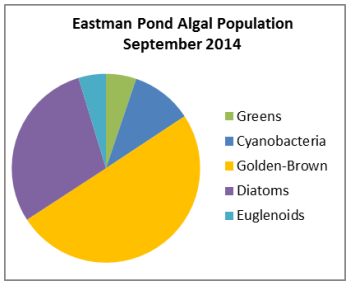
2014 Data Summary

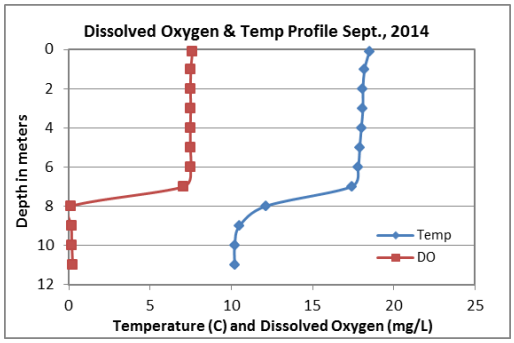
Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels increased from June to July and August, and then decreased in September. Overall, chlorophyll levels were slightly elevated in 2014 and average levels were greater than the state median. However, historical trend analysis indicates significantly decreasing (improving) chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Deep spot and tributary conductivity and chloride levels generally remained elevated and greater than the state medians. Historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity since monitoring began. Spring chloride monitoring indicated elevated levels at North Cove East and West Bks., and Tamari Bk. Chloride levels exceeded the chronic chloride standard at Tamari Bk. in September.
- **E. coli:** E. coli levels at all stations were much less than the state standards for public beaches and surface waters.
- **Total Phosphorus:** Epilimnetic phosphorus levels remained stable and low on each sampling event. September phosphorus levels were abnormal for this station and we suspect cross contamination and the data were invalidated. Historical trend analysis indicates highly variable epilimnetic phosphorus since monitoring began. Hypolimnetic phosphorus levels increased gradually from June to Sept. likely as a result of phosphorus release from bottom sediments under anoxic conditions. Tributary phosphorus levels were in a low to average range with the exception of Anderson Pond Bk.
- **Transparency:** Transparency was slightly lower in July and August when algal growth was higher, and average transparency decreased slightly from 2013. Transparency measured with the viewscope was better than that measured without on each sampling event and likely a better representation of actual conditions. Historical trend analysis indicates relatively stable transparency since monitoring began.
- **Turbidity:** Epilimnetic and Metalimnetic turbidities were slightly above average due to the elevated algal growth. Hypolimnetic turbidity was elevated in September likely due to the accumulation of organic compounds under anoxic conditions. Tamari Bk. turbidity was elevated in July and Aug. likely due to the higher tannin content. Mill Pond Bk. turbidity was slightly elevated in September and it was noted that the water was cloudy. Stoney Bk. All other tributary turbidities were generally within average ranges for those stations.
- **pH:** Epilimnetic pH was within desirable range 6.5-8.0 units however Metalimnetic and Hypolimnetic pH levels were less than desirable. Anderson Pond, Northeast and Stroing Bks. also exhibit lower pH levels.
- **Recommended Actions:** Educate the Eastman Community on best management practices for winter de-icing on driveways and walkways. Obtain a NH Voluntary Salt Applicator License through UNH's Technology Transfer Center's Green SnowPro Certification program. More information and educational materials can be found at www.t2.unh.edu/green-snowpro-training-and-certification. Continue stormwater management activities in the watershed and keep up the great work!

Table 1. 2014 Average Water Quality Data for EASTMAN POND

Station Name	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m NVS	Trans. m VS	Turb. ntu	pH
Epilimnion	8.9	6.96	43	185.0		7	2.55	3.18	1.38	6.77
Metalimnion			39	181.5		11			1.63	6.25
Hypolimnion				200.0		15			4.90	6.41
Anderson Pond				43.5		41			1.71	6.24
East Cove Beach					7					
East Lake Beach					4					
Eastman Brook Outlet			52	193.2	3	7			1.60	7.00
Mill Pond Brook			79	254.5		9			3.07	6.89
North Cove Beach					2					
North Cove East Brook			110							
North Cove West Brook			190							
Northeast Brook			50	268.8		15			0.62	5.96
Northeast Bk. Upstream			22							
S Cover Inner Harbor Bch					1					
South Cove Beach					1					
Stoney Bk At Robin Lane			49	268.8		6			1.87	6.96
Stoney Brook			72	487.3		7			1.90	7.07
Stroing Brook			19	118.0		13			1.08	6.05
Tamari Brook			215	974.5		4			4.40	6.63
West Cove A Beach					8					
West Cove B Beach					1					
West Cove C Lagoon			16							





NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Worsening	Data significantly increasing.	Chlorophyll-a	Improving	Data significantly decreasing.
pH (epilimnion)	Stable	Trend not significant; data highly variable.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data highly variable.